MR. MILTON C. WHITAKER, M.S., general superintendent of the Welsbach's Company's works, has been appointed professor of industrial chemistry, at Columbia University, to the vacancy caused by the retirement of Professor Charles F. Chandler. Dr. Marston Taylor Bogert has been appointed to succeed Dr. Chandler as head of the department of chemistry.

AT Harvard University, Dr. H. W. Morse, in physics, and Dr. L. J. Henderson, in biological chemistry, have been promoted to assistant professorships. Dr. W. R. Brinckerhoff has been appointed assistant professor of pathology and Dr. S. B. Wolbach, assistant professor of bacteriology.

WALTER T. MARVIN, A.B. (Columbia), Ph.D. (Bonn), preceptor in Princeton University since 1905, has been appointed professor of mental philosophy and logic in Rutgers College.

DR. ARTHUR WILLEY, F.R.S., director of the Natural History Museum at Colombo, Ceylon, and marine biologist to the Ceylon government, has been appointed professor of zoology at McGill University. Dr. Willey, a graduate of Cambridge, acted for some years as tutor in biology in Columbia University.

DISCUSSION AND CORRESPONDENCE

AIR CURRENTS IN MOUNTAIN VALLEYS

TO THE EDITOR OF SCIENCE: Mr. Varney's interesting account of the control of cliff shadows on air currents observed in the valleys of the Canadian Selkirks, which appeared in a recent issue of SCIENCE, prompts the following report of some facts of a similar nature noted in the Yosemite Valley.

The lay and configuration of the steep-walled Yosemite trough are such that at no hour of the day, even in mid-summer, are its two sides fully sunlit throughout: there are always cliff shadows here and there; while some dwindle, others grow. The effect of this alternation of light and shadow upon the air movements along the valley sides is most marked, indeed it fairly forces itself upon one's attention when traveling on any of the zigzag trails that lead up out of the valley. On a sunlit slope the dust from the horses' feet floats slowly upward in a golden cloud that accompanies the ascending traveler in a truly exasperating manner. On a shaded slope, the dust cloud pours at once over the edge of the trail, so that parties descending rapidly from zigzag to zigzag constantly meet their own dust wafting down upon them from above. Obviously, the logical thing to do, in order to have a dust-free journey, is to time one's ascent for an hour when the trail is in shadow, and one's descent for an hour when the trail is sunlit. This principle, after it was once understood, was indeed deliberately put in practise by the writer on all occasions when the choice of hour mattered little otherwise—always with the desired result. Some trails, like that to the Yosemite Falls, lie as a rule partly in sun, partly in shadow, and on them the trips were arranged so as to avoid the dust on those stretches where experience had shown it to be densest.

In the Yosemite Valley, as in many other mountain valleys, there is further a pronounced general air movement lengthwise through the trough, proceeding up valley in the day time and down valley at night. The rhythmic regularity with which it reverses in the early morning and in the late afternoon, was made strikingly manifest during the summer of 1905, when severe forest fires near the lower end of the valley sent up a generous volume of smoke in the otherwise pure atmosphere. Every morning the valley was clear, having been swept out, so to speak, by the nocturnal down-valley current, and the pall could be seen floating off to the southwest, down the Sierra flank. But, as the shadows in the valley trough began to shorten and progressively larger areas became insolated, a moment would soon come when the warm up drafts gained the upper hand, and the up-valley current would be inaugurated. Then, the smoke would creep up the valley, becoming denser by degrees, until by nine or ten o'clock one could scarcely see across from rim to rim. This condition would prevail all day, until with the lengthening of the shadows

in the late afternoon, the second reversal would be brought about. The down-valley current would then set in, taking the smoke back with it.

To the writer who was at the time engaged in the topographic survey of the valley this daily smoke invasion was, it may be imagined, a source of no little annoyance; for, while it lasted, it precluded all long-distance graphic triangulation across the valley, the only means whereby the host of peculiar cliff details, so characteristic of the Yosemite Valley, could be located. Nor was it a matter of a day or two; with a provoking regularity rendered possible only by the general absence of disturbing winds and cloudy skies, typical of the region, it continued for four long months with scarce an interruption.

No doubt intimately related to the rhythmic reversals of the lengthwise air current is the period of placidity of Mirror Lake. The surprised and usually vexed tourist who finds he must get up an hour before sunrise if he wishes to see the mirror at its best, little suspects that what he has undertaken to do really amounts to keeping an appointment with the early-morning reversal of the air current, and that punctuality on his part is vital because of the almost momentary briefness of the phenomenon. Yet such is actually the case. The stillness of the water surface sets in as the down-valley draft dies out; but as soon as a sufficient amount of cliff surface has been insolated in Tenaya Canyon, the upward movement becomes general, and a faint tremor once more steals over the lake. That its placidity is less perfect with the afternoon reversal is probably due to the relative suddenness with which that reversal takes place and the almost immediate strength of the downward currents in a narrow steep-walled chasm like Tenaya Canyon.

There is a certain appropriateness, finally, in likening the nocturnal down-valley current to a stream. For not only does it follow the bottom of the valley trough as a channel, but it also receives tributaries from the side valleys. In the case of the Yosemite Valley, the parallel is the more complete, as each tributary air current literally plunges, water-fall-like, from the mouth of its hanging valley. Few visitors to the valley, probably, are aware of the existence of these—shall we call them "air-falls"?—nevertheless they are by no means imaginary, as one may readily find out to his satisfaction by ascending either the Yosemite Falls trail or the Nevada Falls trail in the evening. The writer had occasion to do so many times in returning to his high-level camps above the valley, and the unpleasant memory of the chilling down drafts that poured upon him on these evening trips has not yet lost its vividness.

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THE EFFECT OF ASPHYXIA ON THE PUPIL[1]

OVER a year ago I reported[2] that CO_2 gas produced a practically maximal constriction of the pupil, both in the intact frog and in excised bulbi, and I stated that this behavior of the frog's iris was interesting because asphyxia in mammals produces chiefly dilatation. This latter statement gave surprise to Drs. C. C. Guthrie, F. V. Guthrie and A. H. Ryan and they write in a recent issue of SCIENCE[3] that "in all animals observed, only momentary or no dilatation of the pupil occurs during the first stage of rapid asphyxia (. . .), and that as a rule a *very marked constriction* of the pupil occurs during this stage." It must be noted that these authors speak only of the *first* stage of asphyxia, the stage of hyperpnœa, and do not mention at all the second and third stages, where true asphyxia has developed. Had they pushed their experimental investigations a little farther, they would have found the marked dilatation of the pupil which occurs in mammals during the second and third stages of asphyxia. This well-known dilatation of the pupil is more pronounced and

[1] A reply to Drs. C. C. Guthrie, F. V. Guthrie and A. H. Ryan. (From the department of physiology and pharmacology of the Rockefeller Institute.)

[2] *Amer. J. of Physiol.*, 1908, XXIII., p. xvi; see also report of a demonstration, *Proc. of the Soc. for Exp. Biol. and Med.*, 1908, VI., p. 49.

[3] SCIENCE, March 11, 1910, XXXI., p. 395.